

Capital Expenditures of the Railroads

By Herman Lasker, Division of Economic Research

INDUSTRIAL production, as measured by the Federal Reserve index, has recently risen to a volume comparable with that of the early months of 1937. The staying power of this recovery is dependent, among other factors, upon the current and near-future increases in investment expenditures other than those made for inventory accumulation. One area in which capital outlays have expanded is the railroad industry; hence, the size of this increase in investment and the possibility of its continuing are of fundamental importance to an appraisal of the prospective economic situation.

Volume of traffic carried is the principal factor determining the requirements of the railroads for equipment. The direct connection between earnings and traffic, however, and the greater propensity on the part of the railroads to make purchases when their earnings position is favorable, leads to a fairly close relationship between net railway operating income and total expenditures for construction of ways and structures and for equipment (see fig. 7). Separately considered, expenditures for fixed plant show less variation than those for rolling stock, and this leads to wide fluctuation in equipment purchases with variations in income.

With the large decline in income after 1929, expenditures for new equipment fell to a small fraction of the annual average for the decade of the twenties. Following the increase in carloadings and operating income in 1933, equipment outlays rose in 1934, but it was not until the improvement in operations became marked—in 1936 and 1937—that this item became significantly higher. In 1937 it compared favorably with the same figure for about half the years of the post-war decade. A decline in net railway operating income in 1938 of more than 50 percent from 1937 to the lowest figure of any year since 1932 brought a reduction in new equipment expenditures of almost two-thirds. Of the amount spent for new equipment in 1938, estimated at 121 million dollars,¹ a large part was the result of deliveries of orders placed in the previous year. A resumption of the upward movement in operating income during 1939 was followed by additional orders for new equipment, but the extent of this buying has not been sufficient as yet to bring equipment manufacturing activity up to the levels reached in 1937.

Requirements for New Equipment.

Further placements of new orders by the railroads obviously depend upon their expectations with regard to the need for new equipment, in addition to that now on order, to meet shipping requirements during the coming year. In this connection it may be noted

that the highest weekly loadings reported since 1930, which came during the week of October 21 of this year when over 831,000 cars were loaded, allowed a freight-car surplus for the week of about 50,000 cars, and no important shortages were reported. Loadings of coal and ore increased substantially and the reported

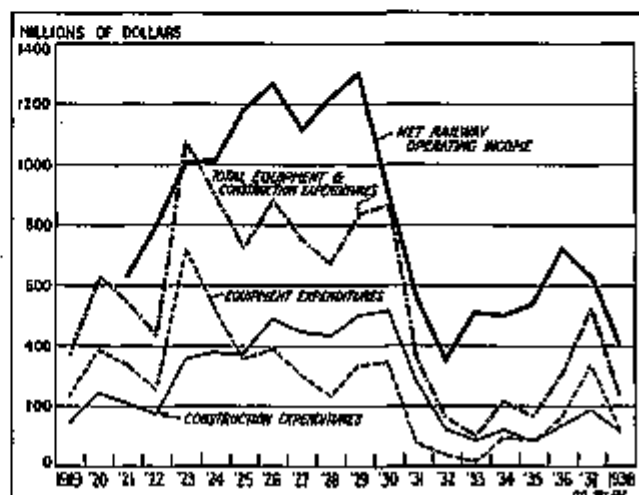


Figure 7.—Net Railway Operating Income and Expenditures for Construction and Equipment, 1919-38. (Income Data are Reported by the Interstate Commerce Commission and Cover All Steam Railways Regarded as One System, Intercompany Payments Eliminated; Expenditure Data are Estimated by the Board of Governors of the Federal Reserve System and Cover All Roads.)

car surpluses of the types used in carrying these commodities were reduced to unusually small figures. However, the number of gondola hopper cars suitable for coal, coke, or ore shipments awaiting repairs on October 1 amounted to more than 110,000 units.

Table 1.—Railway Equipment Installed and Retired, Class I Steam Railways (Excluding Switching and Terminal Companies)

Year	Locomotives ¹			Freight-train cars			Passenger-train cars		
	Installed		Retired	Installed		Retired	Installed		Retired
	Total	New units	Total	Total	New units	Total	Total	New units	Total
1932.....	477	96	2,316	5,645	2,316	84,394	579	68	1,036
1933.....	398	14	2,683	6,410	1,030	117,289	607	7	3,443
1934.....	513	80	3,012	31,280	23,048	129,026	703	270	3,304
1935.....	424	126	3,190	18,480	9,087	122,246	730	225	3,049
1936.....	1,054	98	1,708	72,579	32,354	131,754	1,123	160	1,631
1937.....	977	441	1,381	91,128	60,116	128,325	1,074	379	1,413
1938.....	305	253	1,327	35,721	16,213	70,235	642	275	1,592

¹ Not including reclassifications.

Source: Interstate Commerce Commission.

The ability of the railroads to meet an important part of their needs by repairing old equipment is indicated by the data in tables 1 and 2. The difference between the total number of installations and the part of that total consisting of new units is considerable. The availability of further cars and locomotives for

¹ Estimated Expenditures for New Durable Goods, 1919-38, Federal Reserve Bulletin, September 1939, p. 731.

service after repairs is indicated by the difference between the total number of units on the lines and the number serviceable. This difference comprises those units which are awaiting classified repairs, of which a large proportion can be made serviceable. While the recorded total of locomotives continued the decline which is now of 15 years' duration, repair operations in 1936 and 1937 reduced the percentage of bad-order units to total and yielded net increases in the pieces of equipment available for enlarged traffic requirements in 1937. Similarly, the decline in the number of freight cars—14,000 units from 1936 to 1937—was offset by repairs so that there was a net increase in serviceable units over this same period of 8,000 cars. That the railroads have taken advantage of the supply of equipment awaiting repairs in order to meet current needs is evident from the statement of the Association of American Railroads to the effect that an unusually large number of cars and locomotives were repaired and placed in service just prior to the fall peak in traffic.

While there is a distinct impression that many of the locomotives and cars now in use or awaiting repairs are obsolete or superannuated, the age limits which were commonly accepted during the early twenties have been extended by the greater use of steel in freight and passenger cars and by more efficient building of locomotives. Over three-fourths of the passenger cars are now steel, and of the remaining quarter, two-thirds have steel underframes. The proportion of freight cars entirely steel has increased from less than one-third in 1925 to more than one-half at present, while the same figure for cars either all steel or steel underframe has increased from about three-fourths to over 95 percent (see table 3). The rapid rise in the

proportion of steel cars since 1931 results partly from the decrease in the total number of cars, brought about largely by the retirement of cars of nonsteel construction. However, there is no doubt that the better-constructed equipment on the lines today is capable of longer service than that of earlier periods, and with the large supply of cars and locomotives now available for repair and reinstallation into active service, the requirements of the railroads for new equipment under present conditions of traffic need not be considerable. On the other hand, an increased volume of carloadings beyond the point reached this fall, if sustained, would no doubt necessitate substantial purchases of new equipment.

Table 3.—Steel and Steel Underframe Freight Cars, Class I Steam Railways (Excluding Switching and Terminal Companies)

Year	Percent of total freight cars			Year	Percent of total freight cars		
	Steel or steel underframe	Steel	Steel underframe		Steel or steel underframe	Steel	Steel underframe
1925	75.0	31.7	44.2	1932	85.0	32.4	48.6
1926	79.2	32.4	45.8	1933	86.0	32.6	50.4
1927	80.2	34.0	46.2	1934	81.3	41.7	49.6
1928	81.7	35.6	47.2	1935	82.3	43.6	48.8
1929	83.7	36.9	47.8	1936	84.2	46.5	47.3
1930	85.6	37.1	48.6	1937	86.2	51.1	44.1
1931	87.2	37.8	49.4	1938	85.5	62.6	49.0

Source: Interstate Commerce Commission.

Capacities and Utilization of Existing Equipment.

Another source of increased ability to carry traffic which is not revealed by either the number of serviceable units or the total number available, is the greater power and capacities of the newer locomotives and freight cars. In all the periods shown in table 2, from 1924 through June 1939, the average power of locomotives and the average capacity of freight cars has increased. In several cases these increases have been

Table 2.—Number, Power, Capacity, and Condition of Locomotives and Freight Cars, Class I Steam Railways (Excluding Switching and Terminal Companies)

End of month	Steam locomotives				Electric locomotive units	Freight cars			
	Total	Serviceable	Traction effort ¹			Total	Serviceable	Capacity	
			All locomotives	Average per locomotive				All cars	Average per car
Number	Millions of pounds	Pounds	Number ¹	Thousands	Millions of pounds	1,000 pounds			
December:									
1924	64,670	66,045	2,680	30,016	253	2,337	2,148	207,177	88,643
1925	63,406	63,400	2,584	40,639	302	2,347	2,188	210,137	89,642
1926	63,453	63,010	2,600	41,770	419	2,346	2,200	211,407	90,481
1927	60,784	60,378	2,606	42,600	440	2,313	2,163	210,023	91,175
1928	58,756	58,378	2,592	43,600	500	2,263	2,148	208,650	91,817
1929	56,819	57,707	2,531	44,637	601	2,263	2,144	200,516	92,558
1930	56,878	56,403	2,628	45,407	618	2,268	2,110	210,426	93,211
1931	54,483	57,472	2,498	45,658	670	2,168	2,006	215,013	93,879
1932	53,400	57,033	2,436	46,383	735	2,137	1,981	200,547	94,287
1933	50,923	50,428	2,370	47,088	758	2,077	1,937	192,826	95,108
1934	46,839	50,628	2,261	48,028	749	1,807	1,817	189,303	96,131
1935	44,176	45,401	2,208	48,037	843	1,807	1,850	178,772	96,754
1936	44,085	46,685	2,167	48,211	817	1,745	1,840	179,419	97,043
June: 1937	42,673	50,007	2,160	48,400	.....	1,720	1,875	190,883	98,243
December: 1937	43,446	37,190	2,163	48,781	816	1,731	1,840	178,809	98,708
June: 1938	42,124	35,249	2,166	49,042	.....	1,708	1,478	198,003	98,929
December: 1938	42,442	34,641	2,126	50,100	838	1,682	1,480	194,708	98,170
June: 1939	41,807	33,426	2,108	50,344	.....	1,684	1,431	184,908	98,424

¹ Not including power of boosters.

² Figures prior to 1928 represent "number of locomotives."

Sources: Steam locomotives and freight cars, Association of American Railroads; electric locomotives, Interstate Commerce Commission.

more than sufficient to offset the decreases in the number of units available. While this consideration may not be important to a discussion of available facilities as related to freight-car loadings, each being expressed in number of units, it has a bearing on the ability of the railroads to meet the higher tonnage requirements of a general business expansion.

More efficient routing of available cars through the Car Service Division of the Association of American Railroads has acted to reduce the possibility of car shortages. Except for very brief periods, there have been no important shortages during recent years of low utilization of the railroad facilities, and the systematic shifting of cars to points needed through the activities of this central organization has tended to keep shortages of a local nature at a minimum. The possible invocation of the authority of the Bureau of Service of the Interstate Commerce Commission, should serious shortages be threatened, is also a potential factor, the efficacy of which has not yet been tested.

Purchases of Rails.

Steel rail manufacturing represents a small but important segment of the steel industry, and the position of the railroads in regard to their demand for new rails is of interest in any consideration of the part played by the railroads in the stimulation of other industries. It is evident from table 4 that the major part of total rail production is made use of by the railroads for replace-

ment purposes. Despite large variations in this item for the railroads, the relatively greater stability in demand for rails than for rolling stock is in agreement with the relative stability of expenditures for ways and structures noted above. The more direct relationship between tonnage carried and the wear on rails is a factor in determining the future rail requirements of the railroads in the event of further increases in traffic. Reports indicate large increases in rails currently on order since the summer, but it is doubtful whether the greater part of these are intended for use immediately on delivery. Ordinarily, such orders are placed later in the winter for delivery in time for laying in the spring and summer. The placement of orders at this time appears, therefore, to have the characteristics of the anticipatory buying evident in many lines following the war declarations of September.

Table 4.—Steel Rail Production and New Rail Applied in Renewal by Class I Steam Railways (Excluding Switching and Terminal Companies)

(1,000 tons)					
Year	Steel-rail production	New rail laid in renewal, class I roads	Year	Steel-rail production	New rail laid in renewal, class I roads
1925	2,785	1,859	1932	463	395
1926	2,215	2,219	1933	416	433
1927	2,506	2,125	1934	1,610	431
1928	2,647	2,430	1935	712	485
1929	2,732	1,858	1936	1,226	921
1930	1,873	1,517	1937	1,440	1,033
1931	1,198	885	1938	928	600

Sources: Production, American Iron and Steel Institute; rail laid, Interstate Commerce Commission.

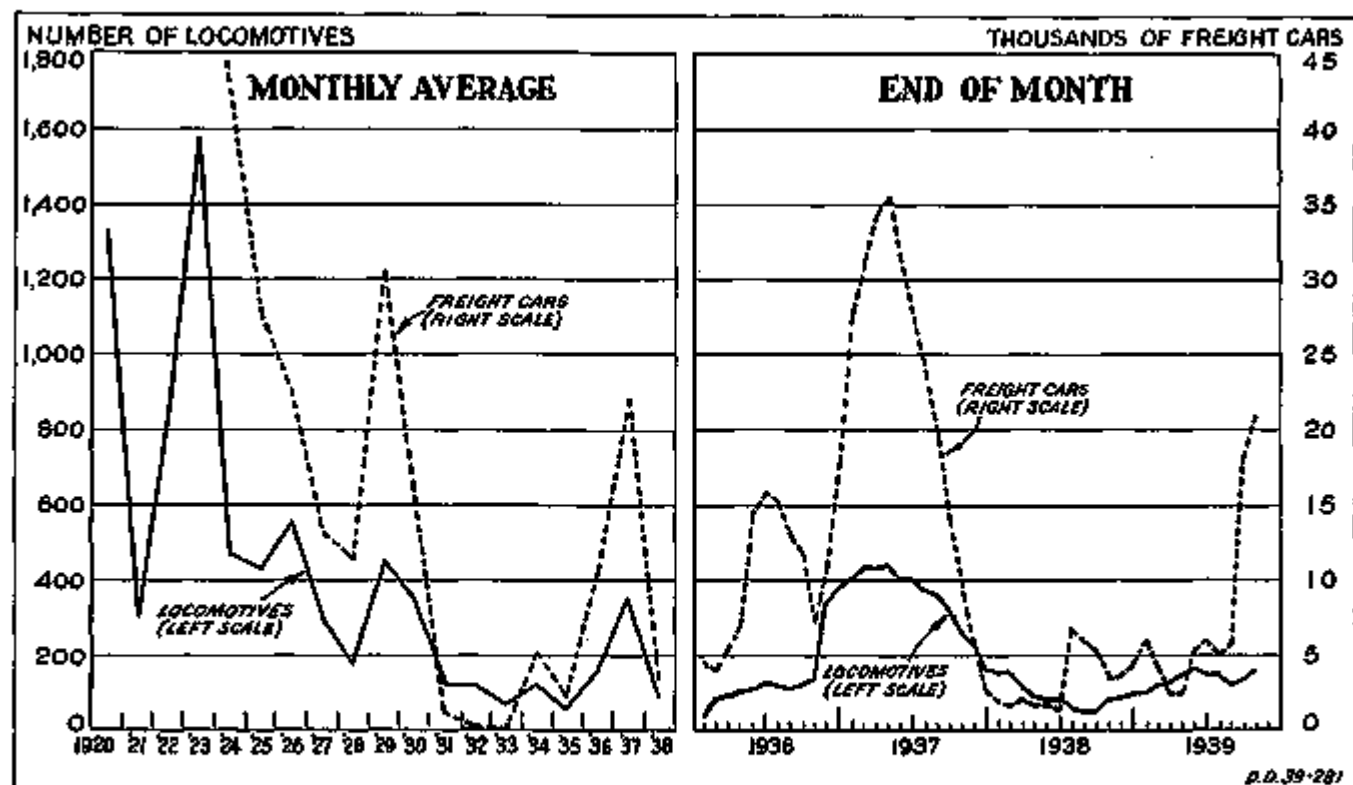


Figure 5.—Unfilled Orders of Equipment Manufacturers, 1928-39. (Data on Locomotives are Reported by the Bureau of the Census and Cover All Purchases; Data on Freight Cars are Reported by the Association of American Railroads and Cover Orders of Class I Roads, Exclusive of Orders to Railroad Shops.)

Railway Equipment Manufacturing Industry.

The degree to which the equipment industry, as distinguished from railroad shops, has shared in expenditures for new equipment has varied considerably. In 1933, Class I railways reported only 1 freight car on order with equipment manufacturers during the entire year, while the number of cars on order in their own shops during the year averaged in excess of 1,000 units. The fluctuations in activity in the railroad shops, as measured by unfilled orders on hand, have been wide, but they have not been so violent as those of the equipment manufacturers. That the railroads are able to fulfill a large part of their requirements themselves is indicated by the fact that during the peak of 1937 activity, unfilled orders held by the railroad shops ran around one-fourth of the total and were higher than at any time since these data were first made available in 1923. More than a fifth of the unfilled railroad freight-car orders at the end of September 1939 were in their own shops, and increases in the number on hand during October were evenly divided between the railroad shops and equipment manufacturers.

Activity in the equipment manufacturing industry naturally reflects the irregular placement of orders by the railroads. The high production immediately after the war was followed by a steady downward movement to exceedingly low totals in 1932 and 1933, with the only important break in this trend occurring in 1929. Federal aid extended to the railroads in 1934 helped reverse the movement and rising freight traffic and earnings in 1936 and 1937 brought further advances in the equipment industry.

Important orders for new equipment were placed late in 1936 and early in 1937 in anticipation of an enlarged volume of traffic during the 1937 fall peak, and these brought unfilled orders held at that time by equipment manufacturers to totals which compared favorably with the volume on hand in 1929 (see fig. 8). With the normal seasonal decline in new equipment demand, shipments exceeded new orders, and unfilled orders on hand dropped after April. Employment was reduced in car manufacturing in July and in locomotive building in October (see fig. 9). Carloadings, which had been maintained at relatively high levels throughout the first three quarters of 1937—reaching a recovery high in September of that year—dropped precipitously during the last three months of the year. For the first quarter of 1938 they were the lowest since 1933. A lack of new orders, usually placed around the year-end for delivery in time for the following fall peak of carloadings, brought about a decline in activity in the railway equipment manufacturing industry. By the middle of 1938, the indexes of employment and pay rolls in the car industry were about one-third of the 1937 top. Employment in the locomotive industry fell in about the same proportion, while pay rolls declined to about a fifth of the earlier figure.

Some improvement toward the close of 1938 and through the first half of 1939 was indicated by the slightly higher volumes of unfilled orders, employment, and pay rolls in the industry; activity nevertheless remained relatively low until September. Then new orders placed for freight cars brought the volume of unfilled orders held by equipment manufacturers at the

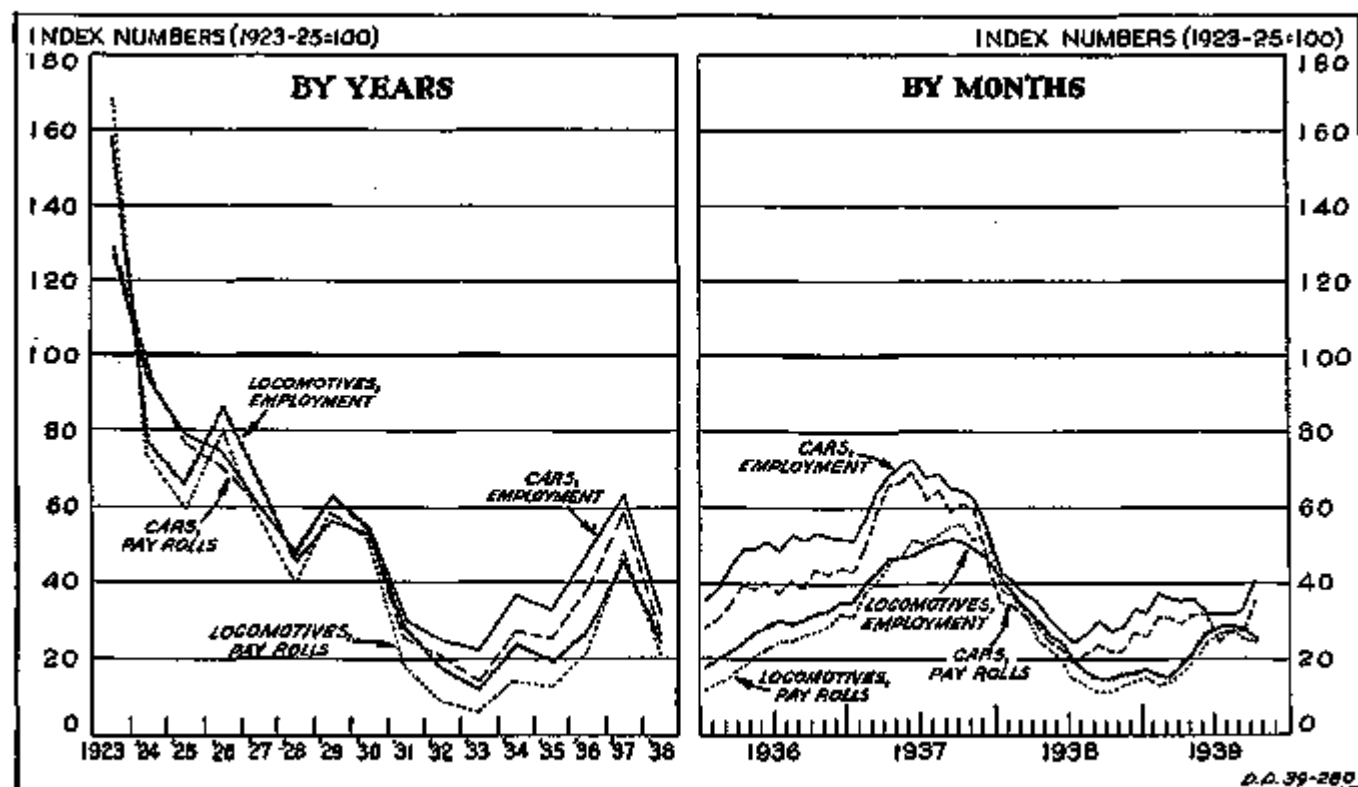


Figure 9.—Employment and Pay Roll Indexes, Car (Electric and Steam Railroad) and Locomotive (Other Than Electric) Building Industries, Not Including Railroad Repair Shops, 1923-39 (U. S. Bureau of Labor Statistics).

month end to the highest total for that month since 1929. While a favorable showing was made in September, due principally to the unseasonal placement of the new orders, the absolute volume of car orders on hand was still only about half the number on hand at the high point of 1937. The comparative position of orders for locomotives was not so favorable as that for freight cars.

Reports for October reveal further increases in the quantity of unfilled orders on hand, though the wave of buying has receded with November placements much reduced. Unfilled freight-car orders at the end of October were about equal to those held in August 1937, and locomotive orders to those held in December 1937. Some gains in employment above that shown in table 3 are, therefore, to be expected. However, these gains may not be great unless further orders are placed in substantial amounts.

Because of the long period of production for the major products and because of shifts in type of output, neither new orders, unfilled orders on hand, nor shipment data for railway equipment afford complete measures of activity in this industry. The employment and payroll data compiled by the Bureau of Labor Statistics of the United States Department of Labor, corrected to the various Census reports, afford perhaps the best indication of the actual trend of operations, including those forms of activity which are related neither to the manufacture of new cars nor to the building of new locomotives. Repair work done by the car industry, as reported by the Bureau of the Census of the United States Department of Commerce, adds some stability to an otherwise widely fluctuating total value product.

While the total value of cars and parts produced fell from 225 million dollars in 1929 to almost 10 million dollars in 1933, the decline in receipts for repair work was from 97 million to 33 million dollars. During this period, employment fell about two-thirds and pay rolls three-fourths. In 1935, receipts for repair work of almost 48 million dollars again exceeded the value of cars and parts produced, and in 1937 a further increase was reported in repairs although the much greater increase in building operations reduced the relative position of this item in the total. Another source of activity which has become of considerable importance to the car industry is the production of other metal products not normally classified in this industry. While this type of production represented less than 8 million dollars of a total of 323 million dollars in 1929, its importance had increased by 1937 to the point that out of a total of 335 million dollars almost 35 million dollars worth of products not normally classified in this industry were reported.

Repair work has not been so substantial a buffer for the locomotive industry as for the car industry, but the manufacture of products not normally belonging to the industry represented more than half of the total product in 1933 and one-fourth in 1935. The percentage-to-total decreased considerably in 1937 as a result of the relatively large orders for new locomotives, but a sizable increase in the "other products" item was nevertheless reported. Both the car and locomotive building industries have developed along lines which offer them limited basic stability even though their main source of operations fluctuates very widely.

The Position of United States Shipping

(Continued from page 13)

but also for purposes of national defense. It has been estimated that, in the event of war with a major power, the military forces alone would require at least 1,000 ships, aggregating 6,000,000 gross tons. In terms of tonnage the present merchant fleet could meet these requirements, but in terms of speed and efficiency it could not.

Most of the present tonnage of this country comprises ships hastily built under the Shipping Board program. In 1914, United States sea tonnage amounted to 2 million tons; in 1921 the total was 13.5 millions, with the bulk of the increase appearing in 1919-21. From 1922 until the present Maritime Commission program got under way, however, American shipbuilding was almost stagnant. Total sea-going tonnage declined steadily from 13.6 million tons in 1922 to 8.9 million tons in 1939. Not one ocean-going ship was launched between 1922 and 1928. The present program of the Maritime Commission calls for 500 ships to be built

during the 10 years ending 1948, roughly a goal of 4,000,000 gross tons.

Within the next 3 years over 3 million tons of United States ocean-going vessels will pass the 20-year mark, in addition to the 4½ million tons now over 20 years old. This total of 7½ million tons represents nearly 90 percent of our present merchant fleet. The Maritime Commission program, therefore, is consistent with replacement needs for national defense alone, regardless of the wartime effects on the shipping industry.

American shipyards are currently operating at a higher level than at any time since 1921, chiefly owing to the Maritime Commission and naval construction programs. In October 1939 over 1,000,000 gross tons of sea-going vessels were under construction or on order, more than double the figure of a year previous. In addition, on October 1 naval vessels of 510,000 tons displacement were under construction, of which around 240,000 tons were in private yards.